Emergency physicians in the Netherlands

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5 Theoretical Contingency Framework

Having clarified the EPs' development in the previous chapter, this chapter presents the theoretical framework that was developed to guide the data collection, analysis, and performance evaluation presented in the subsequent chapters. We first introduce structural contingency theory and its underlying assumptions. Specific attention will be given to the "patterned systems" approach (Van de Ven and Ferry 1980) which will be used to conceptualize the central aspect of "*fit*". We will discuss certain shortcomings of the chosen approach and introduce the concept of social network analysis which will be employed within the contingency framework in order to sharpen the analysis. Second, we will apply the theory to the evaluation objectives of this study and define and link it to the variables.

5.1 Structural contingency theory

We will use structural contingency theory to answer the question of which possible effects EPs can have on an ECU's organizational performance. Structural contingency theory's roots date back to the late 1960s. Early theorists criticized predominant theories at that time, like Weber's bureaucratic approach (Weber 1947), because they neglected the organizations' particular situations to explain ideal organizational structure (Kieser 1993). Lawrence and Lorsch (1967), building on Thompson's (1967) and Woodward's (1965) work, found evidence for the significance of environmental certainty. Burns and Stalker (1961) put forward the statement that organic organizational structures are more successful in dynamic environments whereas mechanic structures are to be used in a stable environments [12].The key element of structural contingency theory is that organizational performance results from a fit between characteristics of structural organization and environmental aspects (i.e. *contingency factors*) (Donaldson 2001). There is no "one best way" for organizational structure. While contingency theory can be applied to a number of organizational characteristics, e.g. leadership (Fiedler 1967) or strategy (Frederickson 1984), *structural* contingency theory focuses on the study of organizational structure (Donaldson 2001). Figure 5.1 summarizes the basic concept of structural contingency theory.

[12] Other early followers of contingency theory are for instance Perrrow (1970), Pugh et al. (1968), or Hage and Aiken (1967). For a more detailed literature overview on early contingency theory see Pennings (1975).

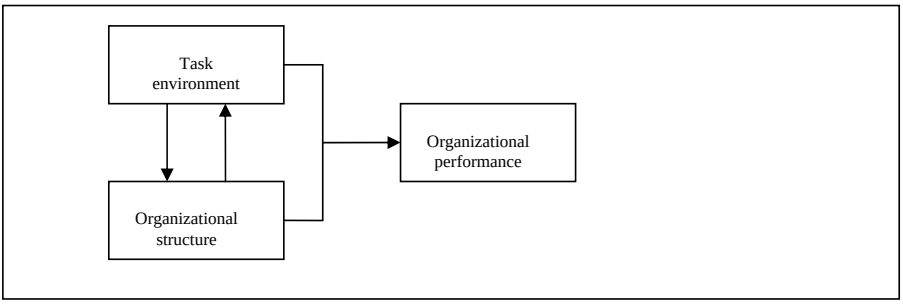

Figure 5.1: Basic concept of structural contingency theory

The three core elements of structural contingency theory are the environment, the organizational structure, and organizational performance.

Environment. It is common to distinguish between an organization's *general* environment and the *task* environment (Sorge 2002). As the general environment is not very specific with regard to the organizational goals or tasks, we will subsequently refer to the *task environment*. Sorge (2002: p. 6) describes the task environment as relating to *"everything that bears on the immediate achievement of the organizational goal, for example state-of-the-art technology, competitors, market structures, sales networks and sources of finance"*. Investigating an organization's whole task environment can easily become way too broad and complex. Well-argued selections should hence be made about which criteria to focus on. Contingency factors whose impact on organizational structure have often been investigated, include uncertainty (e.g. Drazin and Van de Ven 1985; Van de Ven and Ferry 1980; Van de Ven and Delbecq 1974; Galbraith 1973), complexity (e.g. Allred et al. 1995) and task variability (e.g. Van de Ven and Delbecq 1974). We will explain our selection of contingencies in section 5.3.1.

Organizational structure. The organizational structure of units or organizations has long been the main focus of research on the search for efficiency (e.g. Weber's bureaucracy approach or Taylor's scientific management approach). Vroom (2002: p. 54) defines organizational structure as *"the way in which an organization is built up, the way in which relations and relationships between people in an organization are more or less regulated"*. The organizational structure needs to provide a frame to differentiate the organization's/unit's main task and to allocate derived subtasks to

different workers. Subsequently these subtasks need to be reintegrated to achieve the overall goal (Mintzberg 1983). For instance, the overall goal of an emergency care unit is to correctly diagnose incoming patients. Possible actors in the diagnosing process who need to be allocated subtasks are nurses, medical doctors, laboratory/ X-ray assistants, etc. Nurses take general care of the patient, they take blood samples, send the samples to the laboratory, etc. Various doctors can come into play who examine the patient, instruct the nurses as to which diagnostic tests to conduct/ arrange, etc. Laboratory assistants may analyze the blood samples, and radiology assistants may take X-rays. All these different sub-tasks need to be differentiated in a coordinated way, and then subsequently re-integrated in order to achieve the overlying goal, which is being able to make a correct diagnosis. Organizational structure is hence characterized by mechanisms that differentiate and re-integrate the tasks.

Vroom (2002) provides an overview of organization structure characteristics that are typically addressed in literature: differentiation and coordination, standardization (i.e. existence of standards or routines), formalization (i.e. the degree of writing down information and procedures), centralization (i.e. the level of decision power), and configuration (i.e. hierarchy). We will explain our selection of organization structure characteristics in section 5.3.2.

Organizational performance. While being a popular concept in literature, most authors rather describe organizational performance rather than really providing a well-founded definition of it (Maltz et al. 2001). Kanter and Brinkenhoff (1981) though tried to conceptualize "performance", while using it synonymously with "effectiveness"[13]. They found that performance concepts increasingly move away from rationalistic and voluntaristic assumptions of common goals, unity of purpose, and universal performance standards. Performance often becomes a rather political model, where multiple stakeholders both inside and outside an organization try to set performance standards in order to advance their interests. 'Stakeholders' in health care often refer to patients, professionals (like physicians or nurses), or administrators (Jun et al. 1998). It depends on the study's focus which predominant perspective an author chooses. Some authors have tried to link the different perspectives in concepts

[13] Note that Kanter and Brinkenhoff (1981) explicitly acknowledge the distinction between efficiency (i.e. "doing things right") and effectiveness (i.e. "doing the right thing").

of performance in emergency care settings (Tregunno et al. 2004; Graff et al. 2002; Argote 1982; Georgopoulos and Cooke 1979; Georgopoulos 1978). We try to follow these integrated approaches when defining indicators of organizational performance. Details about the selected indicators of organizational performance will be described in section 5.3.3.

5.2 Fit: The patterned systems approach

Besides the three core elements of task environment, organizational structure and organizational performance, the search of "fit" is central in structural contingency theory (van Witteloostuijn 2002). Fit between the organizational structure and the task environment leads to higher performance, whereas misfit leads to lower performance (Donaldson 2001). Drazin and Van de Ven (1985) and Van de Ven and Drazin (1985) differentiate the selection, interaction, and the systems approach to define fit[14]. The selection approach assumes fit is the congruence between the task environment and the organizational structure, and mostly leaves out the explicit impact on organizational performance (e.g. Van de Ven and Delbecq 1974; Hage and Aiken 1969; Perrow 1967). The interaction approach regards fit as being the interaction of paired environment and organizational structure factors which affects organizational performance (e.g. Alexander and Randolph 1985; Schoonhoven 1981; Pennings 1975; Mohr 1971). However, in complex organizations, it is disputable which pairs really affect the performance. The systems approach therefore widens the reductionistic factor-pair based approach by regarding fit as "*the internal consistency of multiple contingencies and multiple structural characteristics"* (Drazin and Van de Ven 1985, p. 515), affecting organizational performance. Certain *patterns* in the interdependencies of the task environment, organizational structure, and organizational performance can be developed and distinguished, enabling assessment of differences between organizations. As Drazin and Van de Ven (1985: p. 522) describe it: *"The tasks for theorists and researchers adopting the systems definition of fit are to identify the feasible set of organizational structures and processes that are effective for different context configurations and to understand which patterns of organizational structure and process are internally consistent and inconsistent"*. For the research at hand we will apply the definition of fit as described by the patterned systems approach (Van de Ven and Drazin 1985; Van de Ven and Ferry 1980). We use the logic in a qualitative way and do not follow the quantitative calculating approach put forward by Van de Ven and Drazin (1985).

[14] Note that Donaldson (2001) introduces different terminology. He suggests the concept of the *managerial decision* instead of selection, *congruence* instead of interaction, and *multifit* instead of a systems approach.

5.3 Application of the theory

Structural contingency theory and the patterned systems approach to fit have regularly been applied to patient care units (e.g. Offenbeek and Knip 2004; Aiken et al. 1997; Mitchell et al. 1996; Allred et al. 1995; Loveridge 1988; Alexander and Randolph 1985; Argote 1982; Leatt and Schneck 1981; Van de Ven and Ferry 1980; Overton et al. 1977; Van de Ven et al. 1976). In the following section we will draw on existing studies and define the core characteristics of task environment, organizational structure and organizational performance that were measured in this study. First, the independent variables will be explained, i.e. task environment (section 5.3.1) and organizational structure (section 5.3.2). Second, the dependent variables that define the organizational performance will be explained (section 5.3.3).

5.3.1 Task environment and context

Van Witteloostuijn (2002, p. 98) describes the task environment to be *"… composed of the set of organizations with which the focal organization has to interact directly in order to grow and survive. Hence immediate stakeholders –such as customers, finance providers, suppliers and competitors- are all part of the task environment"*. This description offers an immense range of variables to investigate. It is therefore essential to narrow the focus by selecting crucial task environmental and contextual characteristics to investigate.

Contingency theory driven studies apply a large number of different environmental characteristics. Overton et al. (1977) in a study on the interplay between the task environment -which in their work was technology- and the organizational structure in a hospital unit setting, defined three environmental dimensions: uncertainty (defined as the degree to which work is difficult and complex), instability (defined as the unpredictable fluctuations), and variability (defined as the engagement in many different tasks). Other studies drew on similar dimensions: Uncertainty was also applied by Allred et al. (1995), Argote (1982), Van de Ven, Delbecq and Koenig (1976), and Galbraith (1973). Examples of instability include Allred et al. (1995) or Comstock and Scott (1977). Variability indicators were included by Van de Ven and Delbecq (1974) and by Pugh et al. (1967).

When trying to apply the depicted dimensions to ECU task environments, approaches from two sides are possible: "uncertainty", for example, could be high due

to insufficient knowledge about the number of patients who come to the ECU per hour/day/week. It could also be high due to insufficient knowledge about the required input of professional resources by employees (e.g. minor injuries can be handled by interns while major injuries require more senior doctors). Hinings et al. (2003) refer in this context to the exogenous and endogenous sources of uncertainty. It is therefore important to distinguish between characteristics of the demanded care –i.e. characteristics of the patients coming to the ECU- and characteristics between the professional resources available at the ECU. A contextual dimension that has largely been neglected in contingency health care research is the managerial and political setting of units. Network theory suggests that organizational units can be linked by financial dependence or by decision making regulations for instance (Tsai 2002). We assume that the position of a unit within an organization, its managerial situation and its autonomy or dependence on other units can possibly affect the embodiment of organizational structure and the organizational performance. Important characteristics of task environment and context can thus be distinguished as follows: 1) characteristics of demanded care, 2) characteristics of professional resources, 3) managerial and political setting.

Characteristics of demanded care. Characteristics of demanded care describe the patient mix that an ECU is facing. Aiken et al. (1997) highlight the importance of taking aggregated patient characteristics into account to explain clinical outcomes. Also Flood and Scott (1987) indicate that patient case mix and volume can affect the quality of care. Rondeau and Francescutti (2005) state that the ECU environment *"is characterized by heavy patient demands"* (p. 328). They use patient input volume, the source of patients' referral and the variation of the complaints' severity to explain physicians' job satisfaction. Argote (1982) employs measures of the patient volume of certain medical conditions to investigate the affect of input uncertainty on ECUs' effectiveness. Based on the existing literature, we operationalize demanded care in this study as follows:

(1) The input volume, which refers to the number of patients coming to an ECU per day and per hour.

(2) The input variation, which describes the diversity of the incoming patients' complaints with regard to a) the severity of the complaint and b) the main medical specialty involved.

(3) The input predictability, which refers to the deviation of the input volume and variation per day.

Characteristics of professional resources. Characteristics of professional resources describe the kind and the volume of personnel available for tasks at the ECU. According to Flood and Scott (1987) staff qualifications are a core indicator to explain the quality of care; they also highlight the importance of teaching status for a unit's performance. Gerbeaux et al. (1999) found that medical students negatively affect patients' length of stay in an emergency department. It is hence not only important to know about the different kinds and specialties of potentially available doctors, it is also important to know to what extent ECU patients need to serve doctors in training as training objects. In non-teaching hospitals, ECUs are traditionally staffed by interns or GP residents with specialists coming for supervision if needed. In teaching hospitals, residents of various disciplines might need to see emergency patients for training purposes, thereby creating a completely different task environmental situation. In this study we therefore investigate the following characteristics of professional resources:

(1) The occupational structure, which indicates the different kinds of doctors available for medical ECU tasks.

(2) The volume of education, which refers to the ratio of young doctors in training working at the ECU.

Managerial and political setting. Some scholars have stressed that contingencies not only exist outside the organization, but that the given embeddedness in a complex intra-organizational societal web of structures of resources and players also plays a role (Granovetter 1985).

The managerial setting of an ECU refers to the management structure and to the situation of the unit within the organization. Some ECUs might be stand-alone units with an autonomous management, while others may be organizationally linked to other departments, which can be expressed by shared management. Some ECUs may only have a managerial head for the nurses, while others may also have a medical manager. Some ECUs managers may be able to make decisions fairly autonomously while others may be closely linked to other decision makers. All of these characteristics are expected to potentially affect the organizational structure and

organizational performance. The political setting in this study refers to the context, structure, and process of implementing EPs. This knowledge will provide insight into the emerging roles of EPs. Data on this indicator were accordingly only collected in ECUs where EPs are used. It describes the history of EP implementation, including the roles of the different stakeholders in the hospital in the process. The managerial and political setting of an ECU thus comprises:

(1) The managerial situation of an ECU, referring to the existing management structure and the ECU's integration into the hospital.

(2) The history of the EPs' implementation, including the role of different hospital stakeholders.

5.3.2 Organizational structure

Organizational structure and its analysis have often been discussed. The predominant basic assumption is that organizational structure consists of a structure and a process (e.g. Van de Ven and Ferry 1980). The structure describes how the organization's task is disaggregated and allocated to units or people. The process refers to the re-integration of sub-tasks in order to complete the organization's task. As Mintzberg (1983) puts it: *"the structure of an organization can be defined as the sum total of the ways in which its labor is divided into distinct tasks and then its coordination is achieved among these tasks"* (p. 2). The structural characteristics –e.g. degree of division of labor or the interdependence between the disaggregated tasks- determine the required coordinative process.

According to Kieser (1993), many concepts of organizational structure are based on Weber's (1947) bureaucracy approach (Pugh et al. 1968, 1963; Udy 1965, 1959; Hall 1963). Among others, Weber (1947) distinguishes the following dimensions of organizational structure: division of work, hierarchy, rules and procedures, and formalization. These dimensions match Vroom's (2002) more recent overview of typically addressed structural dimensions which uses a slightly different terminology: differentiation (division of work) and coordination, standardization (existence of standards or routines), formalization (degree of writing down information and procedures), centralization (level of decision power), and configuration (hierarchy). These dimensions have also frequently been applied to

contingency studies in health care settings (e.g. Allred et al. 1995; Argote 1982; Alexander 1982).

Coordination is one of the most prominently researched structural dimensions. Numerous scholars have investigated it (e.g. Bechky 2006; Gittell and Weiss 2004; Gittell 2000; Sicotte 1993), and several approaches for its general conceptualization have been put forward (e.g. Gittell and Weiss 2004; Mintzberg 1983; Van de Ven et al. 1976; Georgopoulos and Mann 1962; March and Simon 1958). Quinn and Dutton (2005) provide a valuable overview of coordination in organizations research. Several studies stress a positive relationship between the use of coordination systems and organizational performance in health care (Argote 1982; Flood and Scott 1987; Price and Mueller 1981; Weisman et al. 1981; Shortell et al. 1976; Longest 1974; Georgopoulos and Mann 1962). Coordination is thus an important dimension of organizational structure in health care units and shall be investigated in this study.

Besides coordination, the division of labor into distinct tasks is another fundamental requirement involved by organizational structure (Mintzberg 1983; Kieser 1993). Organization literature mostly refers to it as *differentiation*. Lawrence and Lorsch (1967) define differentiation as *"the state of segmentation of the organizational systems into subsystems"*. It shall as well be investigated in this study. The following paragraph introduces the dimensions differentiation and coordination in more detail and explains the applied conceptualization of organizational structure.

Differentiation. An important part of the organizational structure is to disaggregate the organization's task and to assign people with certain competencies or interests to certain sub-tasks. In ECUs a sum of tasks, constituting the patient care process, needs to be allocated to different people[15]. Following Vroom (2002) we regard differentiation as *"the total number of specialisms in a given organization and the degree of role differentiation (the number of different tasks or actions which are brought together in one single function)"* (p. 58). Horizontal and vertical differentiation can be distinguished (Mintzberg 1983). Horizontal differentiation refers to the breadth of a professional role. It can be very broad, where an employee

[15] Please note that the expression *patient care* is used very broadly here. We acknowledge the distinction between care and cure (see Mintzberg 2002; Butler et al. 1996) which refers to the difference between tasks that have traditionally been assigned to nurses and to doctors. We also acknowledge that the expression *patient care* may not cover all tasks conducted in ECUs (e.g. managerial tasks or research). Still, we use the term for reasons of simplicity.

would be required to handle all tasks within a certain process. But it can also be very narrow, meaning that diverse employees are required to contribute to a process. In our context, where many different occupational groups are involved in patient care at the ECU, horizontal differentiation is high (e.g. emergency nurses, interns, residents of possibly several specialties, specialists of possibly several specialties, radiology and laboratory assistants, etcetera). Vertical differentiation, in this context, refers to the level of knowledge and control that is required to complete a process. An example of vertical differentiation is the medical hierarchy, consisting of interns, residents of various training levels, and specialists. Both kinds of differentiation occur in ECUs, as different occupational groups of different knowledge backgrounds interact with one another. EPs obviously represent a case of vertical differentiation; due to their education, they represent a quasi-hierarchical layer between residents and specialists. At the same time they contribute to horizontal integration by combining abilities of various occupations who traditionally work at ECUs (interns, residents of various specialties, partly specialists of various specialties).

Coordination. Coordination supplements differentiation (D'Aunno 2001). Tasks that had previously been distributed to several people need to be reintegrated. If a higher degree of differentiation occurred beforehand, more coordination will subsequently be necessary for reintegration (Kieser 1993). Several concepts that categorize coordination mechanisms have been put forward. Mintzberg (1983), for instance, differentiates between mutual adjustment, direct supervision, and four kinds of standardization: work processes, outputs, norms and skills. Georgopoulos and Mann (1962) categorized coordination in emergency departments according to programmed and non-programmed means (see also Georgopoulos and Cooke 1979 for further development). Other health care researchers followed their concept (Charns and Schaefer 1983; Argote 1982). Van de Ven et al. (1976) put forward a different categorization which also has been applied for health care research (Allred et al. 1995). They build on March and Simon's (1958) idea of coordination by (1) programming or (2) by feedback. Programming comprises all forms of *impersonal coordination*, such as pre-established plans, formalized rules or guidelines, and standardized information systems. Coordination by feedback distinguishes between *personal* mechanisms and *group* mechanisms. Personal mechanisms include for

instance, direct supervision (vertical communication) or horizontal communication in a non-hierarchical relationship; an example of a group mechanism is meetings.

A shortcoming of most studies of structural contingency theory is that the personal mode is often limited to a description of the coordination between people on an aggregated work unit level. *People's* characteristics are measured instead of the characteristics of the *relations* between people. The aggregation level is thus fairly high. For instance: Van de Ven et al. (1976) measure solely the usage of personal and group coordination modes *("To what extent are various mechanisms used?"*). Allred et al. (1995), who also uses Van de Ven et al.'s (1976) categorization of coordination mechanisms, base their measurement on a scale used by Charns et al. (1981). They assess the type of coordination mechanisms used in different kinds of situations. These examples illustrate that personal coordination mechanisms are often investigated at a rather high aggregation level. A rare counter-example of research stressing the importance of relations in coordination is Gittell (2002). She investigates the importance of relational coordination for task integration and shows that intense relational coordination between service providers with a shared goal can affect the performance. Following Gittell (2002), we want to expand the common perspective on personal coordination. We sharpen the level of analysis by directing attention to the relations between the different actors within ECUs. Figure 5.2 provides our concept of organizational structure.

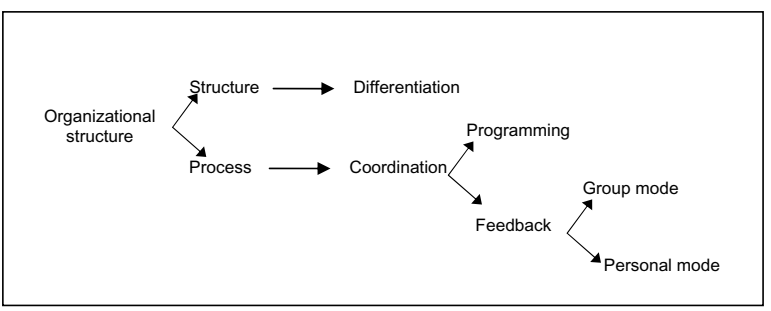

Figure 5.2: Applied conceptualization of organizational structure

5.3.2.1 Differentiation

According to Vroom (2002), differentiation refers to the division of work within an organization. The division of work is described as *task allocation* by Older, Waterson, and Clegg (1997); *"task allocation is the decision that determines whether a task should be allocated to human or machine and, if human, which human"*. It is captured by what Mintzberg (1983) refers to as horizontal differentiation and describes the typical split of tasks between professionals. Applied to the patient care process in ECUs, it therefore comprises information about who does what for which patient stream. More specifically, which professional is in what way involved in the following main components of the patient throughput process: admission, first investigation, conducting diagnostic tests, diagnosing, deciding treatment and arranging further care/ providing further care/ discharge. This description also includes indicators about the vertical differentiation, as it comprises information about the importance of hierarchy in the care process, the discretion of professionals, and supervisory structures. Summarizing, we investigate the following characteristics of differentiation:

(1) Which professionals are in what way involved in the following steps of patient throughput: admission, first investigation, conduction of diagnostic tests, diagnosing, arranging further care/ providing further care/ discharge? Note that we will only investigate the throughput process of the most common patients, who are in a non life-threatening situation[16].

(2) Who decides on suitable treatment?

(3) If EPs are used, what is their main task and which patients do they get to see?

5.3.2.2 Coordination

Literature on organizational structure provides many definitions of coordination. Van de Ven et al. (1976) state that *"Coordination means integrating or linking together different parts of an organization to accomplish a collective set of tasks"*. Argote (1982) says that *"Coordination involves fitting together the activities of organization members…"*. Gittell and Weiss (2004) describe coordination as *"an activity that is fundamentally about connections among interdependent actors who must transfer*

[16] As we will show later on, the percentage of patients in an acute life-threatening situation ranges from 1%-3%, based on the assessment of experienced nurses (so-called *triage nurses*).

information and other resources to achieve outcomes". All of these definitions share the core idea that coordination re-integrates previously split tasks in order to achieve an outcome. Coordination mechanisms are means to achieve coordination. Various kinds of coordination mechanisms are presented in the literature. We base our study on the basic coordination method put forward by March and Simon (1958): programming and feedback.

Programming. Programming, as introduced by March and Simon (1958), is based on pre-established schedules (Hage, Aiken, and Marrett 1971). Thompson (1967) interprets it as standardization (Hage, Aiken, and Marrett 1972). Van de Ven et al. (1976) define it as an impersonal coordination mode, exemplified by *"pre-established plans, schedules, forecasts, formalized rules, policies and procedures, and standardized information and communication systems"*. Their use requires minimal verbal communication between the different users (Galbraith 1973, 1970), and coordination is exercised through an impersonal mode (Van de Ven et al. 1976). Gittell and Weiss (2004) split up impersonal coordination and differentiate between routines and information systems as coordination mechanisms (see also Gittell 2002). Following these approaches, we investigate the presence, use and perceived intensity of the use following programming coordination mechanisms in this study:

(1) **Routines.** According to organization theory, routines can help to achieve coordination by pre-specifying the tasks to be performed and the sequence of performance (Van de Ven et al. 1976; Galbraith 1973; Thompson 1967). Important routines in medical settings, thus in ECUs, are protocols and guidelines[17] (Campbell and Sinclair 2004).

(2) **Information systems.** Information systems facilitate coordination by providing a uniform infrastructure to all participants in a common work process (Venkatramen 1994). The degree to which such systems are automated and IT based varies. Important information systems in ECUs are patient medical records and patients' diagnostic tests. The diagnostic tests will, in

[17] The terms protocols and guidelines are frequently used interchangeably, despite the officially more stringent nature of protocols than guidelines. Other expressions used are medical or clinical guidelines/ protocols, clinical practice guidelines, etc. All of these expressions refer to documents that provide guidance and decision criteria for specific areas of healthcare. They can range from prescribing action in very specific situations (e.g. dealing with sprained ankles) to rather broad codes of behavior (e.g. handling of patients). For reasons of simplicity, in the remainder of this book, we will use the terms *protocols* or *guidelines* alternatively to refer to any kind of written or unwritten mandatory procedure.

fact, often become a part of the medical record once the laboratory, X-ray or nursing staff add the relevant information to the patient's file. While both patient records and results of diagnostic tests are still collected on paper in some hospitals, an increasing number of hospitals are beginning to file more and more patient information in shared electronic patient records which are accessible by all employees involved with a patient at the same time. Another important information system in ECUs is the whiteboard. On the whiteboard every patient's progress through the ECU is kept track of. It provides information about patients who are announced to come in (by their GP) and patients who are in the waiting rooms. It shows which patient is in which treatment room and by which nurse and by which doctor (s)he is being seen. Some ECUs still use a physical whiteboard with pens to write on; others use electronic, computer-based whiteboards.

Feedback. Besides programming, feedback is described as the second coordination method by March and Simon (1958). According to Hage et al. (1971), it involves the transmission of new information (see also Hage et al. 1972 and Thomson 1967). Van de Ven et al. (1976) explain the further distinction between a personal mode and a group mode.

Group mode. Van de Ven et al. (1976) describe that mutual adjustment in the group mode is vested through staff or committee meetings. Meetings as coordination mechanisms are also investigated by Gittell and Weiss (2004). We follow these approaches, and investigate the existence of meetings as a group mode feedback coordination mechanism in this study:

Meetings provide a forum for interaction and are an important coordination mechanism. Some authors distinguish between scheduled and unscheduled meetings (Hage et al. 1971). Unscheduled meetings for ECU staff are very rare due to the required work with unscheduled patients. Therefore we only focus on scheduled meetings. We investigate which ECU staff members participate in which meetings and how often meetings take place.

Personal mode. Van de Ven et al. (1976) argue that mutual adjustment in the personal mode is achieved through vertical or horizontal channels of communication

between individuals. As explained earlier, we want to investigate a more detailed level of analysis than most structural contingency studies. This study classifies the relational structure of ECUs as the personal mode. The relational structure characterizes the connections between occupational ECU groups that are involved in patient care. Gittell (2002) provides a definition of relational coordination which we adapt to define relational structure. The relational structure of a work unit in this study is *"a mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration".*

The major body of literature investigating relational structures is network theory. It is based on the relationships between interacting actors, units, or organizations (Granovetter 1985). Interdependent actors are linked to one another by relational ties. These relational ties form the basis for social network analysis. The relational structure is comprised of patterns of relations among actors (Wassermann and Faust 1995). Social network research in recent years has increasingly brought together patterns of relationships with performance variation (Tsai 2001; Hansen 1999). For an overview of further areas of application see Borgatti and Foster 2003. The application of social network analysis in patient care processes, however, is still scarce.

Three different kinds of network levels can be differentiated: ego networks, group networks, and social system networks (Monge and Eisenberg 1987; Burt 1980). In this study, we aggregate data from individual respondents per occupational group, hence analyzing the group network. Aggregating the data per occupational group helps to reduce the danger of missing values, to which network analysis is very sensitive (Burt 1987: p. 63) as they can create *"huge holes in the who-to-whom data matrix"* (Rogers and Kincaid 1981). We identified the following indicators to characterize the investigated networks:

(1) **Members of the network.** As we investigate the group level, possible members of the network are occupational groups rather than individuals.

(2) **Frequency of contact.** The frequency of contacts forms the basis of relational patterns. It indicates whether or not a relation exists between two occupational groups and provides details about its intensity.

(3) **Nature of the contact**. We distinguish between face-to-face contact and contact by telephone.

(4) **Importance of the contact for patient care.**

(5) **The initiator of the contact.** Information about the initiator of the contact forms another important characteristic of the network pattern as it indicates the direction of a relational tie.

5.3.3 Organizational performance

Organizational performance in health care studies can take many different shapes. Some authors focus on the interests of single stakeholders (e.g. patients, professionals (nurses or doctors), or the hospital management). Tregunno et al. (2004) found that *"evaluation of performance from the perspective of any one stakeholder group will result in an unbalanced assessment of ED* [i.e. emergency department] *performance"*. They, like other authors (Graff et al. 2002; Cairns et al. 1998; Argote 1982; Georgopoulos and Cooke 1979; Georgopoulos 1978), suggest a combination of different dimension. Cairns et al. (1998) suggest using emergency care performance measures in three areas -quality of care, costs of care, and quality of life- without providing concrete suggestions for this approach. The Hospital Emergency Services project (Georgopoulos and Cooke 1979; Georgopoulos 1978) categorizes performance –they talk about *organizational effectiveness*- as clinical, economic, and social efficiency (Argote 1982). Graff et al. (2002) present similar three dimensions (they use the term *quality measures* instead of *effectiveness* or *performance*): clinical quality, service quality, and cost efficiency. They define the clinical quality as the medical outcomes compared with benchmark data. Argote (1982) describes clinical effectiveness as the quality and the promptness of care. Other authors, however, attach the promptness of care to patient satisfaction (e.g. Bursch et al. 1993), which matches an aspect of Graff et al.'s (2002) *service quality*. Flood and Scott's (1987) conceptualization of quality of care distinguishes between two interrelated dimensions: the effectiveness of care and the efficiency of its production. *Effectiveness* is described as *"the extent to which the desired health output is obtained"*; *efficiency* is *"the ratio of inputs to outputs and ... the extent to which resources are minimized in producing a given output"* (p. 103). The different dimensions of organizational performance of ECUs can thus be antipodal as well as intertwined. Researchers need to make a choice which dimensions to distinguish and to investigate.

In this study we distinguish between following dimensions of organizational performance:

(1) **Organizational quality of care**. This refers to the quality aspects that patients experience during their stay at the ECU.

(2) **Costs**. This refers to the efficient use of resources.

(3) **Working climate**. This refers to the atmosphere that employees experience during their work at the ECU.

(4) **Medical quality**. This refers to the quality delivered by doctors at the ECU with regard to diagnosing patients.

5.3.3.1 Organizational quality of care

Organizational quality of care is regarded as the extent to which a customer (i.e. patient) oriented care process takes place, independently of the medical quality or the medical outcome. We build on some existing studies of patients' expectations and satisfaction indicators (see Trout et al. (2000) for an overview of existing studies on patient satisfaction studies). Many scholars measure satisfaction as perceived by patients rather than measuring objective indicators. Yarnold et al. (1998) found that patients' perceptions of the quality aspects of the care they receive can largely vary between different types of hospitals (e.g. academic hospitals or community hospitals) regardless of the objective natures of the aspect. For example: Patients of academic hospitals may perceive waiting times of a certain length as acceptable, while patients of community hospitals may find equally long waiting times unacceptable. Comparisons of the performance based on patients' perceptions would therefore be difficult. We therefore decided to use existing indicators of patient satisfaction rather than measuring patients' perceptions.

Indicators that measure duration have frequently been applied in health care settings. One important duration indicator of organizational quality of care is the waiting time for patients before the care. Authors who suggest this measure are Brown et al. (2005), Tregunno et al. (2004), Keller (2004), Nairn et al. (2004), Graff et al. (2002), Magid et al. (2002), or Bursch et al. (1993). Another, related, measure is the total length of stay (Sinreich and Marmor 2005; Yoon et al. 2003; Graff et al. 2002; Lindsay et al. 2002; Chan et al. 1997; Krishel and Baraff 1993). These two

measures can be difficult to interpret if analyzed in stand-alone fashion. For example, long stays can occur as a result of long waiting times, but they can also result from long treatment times, which might be necessary for certain complex patients. A third measure that needs to accompany waiting and throughput times is thus the lengths of the treatment. Waiting time and treatment time together sum up to the total throughput time. Lindsay et al. (2002) present another measure of organizational quality of care. They investigate the number of unplanned return visits to ECUs. If patients feel uncertain about the treatment or the advice that they received during their stay at the ECU and return to the ECU within a few days to check on their condition, the organizational quality of care for this patient is low. Tregunno et al. (2004) present the same indicator, but they restrict it to return visits that result in hospitalization.

Another indicator is the number of different faces (i.e. different doctors and nurses) by whom a patient is seen during his stay at the ECU. The different care providers are a possible source of information for the patient as they can communicate with him or her. Trout et al. (2000) find a strong positive association between provider-patient communication and the quality that patients perceive. Other scholars who highlight this importance of communication are Hall (1996) and Björvell and Stieg (1991). Taylor et al. (2002) investigate the details of emergency department patients' complaints about communication. While the majority of complaints results from the personal attitude of staff (e.g. rudeness, uncaring attitude) about 25% of complaints refer to poorly organized patient communication (communication breakdown or conflicting information). According to experts in the field, these communication problems might be due to the unclear allocation of responsibilities for ECU patients. With several doctors and nurses seeing a patient, the danger exists that the patient does not get consistent information about this or her condition or that (s)he does not get sufficient information. EPs are expected to integrate different doctors' medical skills. Therefore, fewer medical care providers are required for the patients' ECU throughput, leading to more perceived continuity and consistent information provision. Fewer different faces seen by a patient can therefore serve as an indicator for higher organizational quality of care.

In summary, the following indicators of organizational quality of care are investigated in this study:

(1) Waiting times

(2) Treatment times

(3) Throughput times
(4) Number of unscheduled returns
(5) Number of different care providers per patient.

5.3.3.2 Costs

The costs refer to the efficient use of ECU resources. Flood and Fennell (1995) call the costs and the efficiency with which health care is delivered a dominant criterion in health care organization. One may think that costs represent the performance level mainly in the interest of hospital administrators. But in times of increasing competition between hospitals and impending closures, cost-containment has become an issue for health professionals who want to keep their jobs, and patients, who want to maintain emergency care in their immediate neighborhood. The focus of this study is not on calculating costs of emergency care. This could become too far reaching as many detailed insights would be required about material procurement, management accounting, and personnel costs which would shift the focus of the study away from the ECU organization. Rather we want to investigate if care could be provided more beneficially by reducing unnecessary use of resources. An indicator of the use of resources that many health care scholars put forward is diagnostic tests. Logan and Scott (1996) state that high uncertainty, in ECUs either occurring due to variation of patients or due to insufficient knowledge of clinicians, can result in too high a number of diagnostic tests and overinvestigation, implying unnecessary costs and wasted money. Magid et al. (2002) also find that too many unnecessary diagnostic imaging tests account for a waste of equipment and money. The number of ordered diagnostic tests was also used as performance criterion by Hirshberg, Holliman, Wuerz, and Chapman (1997) to compare case management by emergency physicians versus other professionals. Other authors who support the importance of the number of conducted diagnostic tests to investigate performance are Campbell and Sinclair (2004) and Lindsay et al. (2002). We focus on the most popular diagnostic tests: blood tests and X-ray pictures.

Another important criterion is the number of consultations that ECU doctors order from specialties[18]. According to experts' opinions, one of the major problems in traditional ECU patients' throughput is the delay due to waiting for specialists. Not only does this increase the total patient throughput time, it also blocks a treatment room, therewith increasing waits for subsequent patients. Moreover, calling specialists off to the ECU takes them away from seeing patients on their own department. A specialist running back and forth between departments in a hospital does not only disturb his own workflow; it is also a waste of an expensive human resource. EPs receive broad training, covering many medical specialist areas. They are trained to be broader skilled than most residents and interns. It can therefore be expected, that EPs' employment leads to fewer specialist consultations.

The two following indicators are thus defined to measure costs:

(1) Number of diagnostic tests

(2) Number of ordered specialist consultations.

5.3.3.3 Working climate

The working climate refers to the atmosphere that employees experience during their work at the ECU. Anderson and West (1998) differentiate the *cognitive schema approach* and the *shared perceptions approach* to define climate. The former is based on individuals' cognitions and tries to uncover single actors' sense-making of their work environment (e.g. Ashforth 1985). The latter defines climate as *"shared perceptions of organizational policies, practices and procedures"* (Reichers and Schneider 1990: 22). This study follows the latter approach and tries to identify the shared perceptions at the ECU level.

A number of studies argue that aspects of the working climate are closely linked to other dimensions of organizational performance. Van der Vegt and Stuart (2005) investigated multidisciplinary teams in the oil and gas industry. They found

[18] We follow the definition of a consultation (or consult) provided by the American Academy of Family Physicians (2007): *"The consultation is a request from a physician for a procedure or advisory opinion. (...) The request for a consultation for patients should be documented in writing, and should be accompanied by relevant medical information. The consultant performs a requested procedure and/or makes recommendations regarding diagnosis and/or treatment in a timely manner, but does not initiate other treatment. A written report of findings and recommendations should become part of the patient's record. The patient remains in the care of the physician who requested the consultation. The physician who requested the consultation uses professional judgment in deciding whether or not to act on the consultant's recommendation. (...)."*

that low collective identification is negatively related to team learning and performance. Denny, Steinhart, and Yu (2003) and Croskerry (2000) indicate the importance of a positive work perception of ECU staff for other performance dimensions, especially for the medical quality and the organizational quality of care (throughput times). Reagans, Argote, and Brooks (2005) argue that the individual hospital employees' experience contributes to the team performance, which can then contribute to improvements in overall coordination. A positive loop can thus be drawn from the individuals' experience to increased organizational performance. It could be argued that working climate influences other dimensions of organizational performance rather than being a performance dimension itself. We think, however, that working climate itself is affected by the task environment and by the organizational structure. It is an outcome on the staff level, thus in the first instance representing the staff as stakeholder group. Yet, like some of the other described dimensions of organizational performance, by serving the staff it also serves other stakeholders: satisfied staff members will be likely to handle patients gentler, more courteously, and with more dedication. In a climate emphasizing learning, they are more likely to start thinking outside the box and may try to find ways to deliver adequate care at adequate costs.

Several authors investigate different dimensions of the working climate. According to Pathman, Konrad, Williams, Scheckler, Linzer, and Douglas (2002), autonomy and professional control are the most important factors for EP job dissatisfaction (see also Rondeau and Francescutti's (2005) investigation of ECU physicians' job satisfaction). Tregunno et al. (2004) distinguish overall staff satisfaction of physicians and nurses, the workload, and opportunities for staff training. Croskerry (2000) highlights the importance of feedback, learning, and job fulfillment for ECU staff in order to be able provide efficient outcome. Denny et al. (2003) stress the importance of experienced teamwork. These studies show that different dimensions of working climate need to be taken into account in order to draw a complete picture of an employee's working situation. In this study, we applied the following dimensions of working climate:

(1) **Interpersonal atmosphere**; refers to the overall atmosphere that is felt among colleagues

(2) **Interpersonal support**; refers to the support that employees experience to receive from their ECU colleagues, independently of professional groups and hierarchies.

(3) **Interpersonal harmony**; refers to the extent to which employees experience conflicts with their colleagues.

(4) **Commitment**; refers to an employee's individual attitude to external parties and to the solidarity felt with the ECU

(5) **Experienced opportunities for personal development**; refers to the opportunities that someone experiences individually to develop in their work.

(6) **Challenging nature of the work**; refers to employees' experience, in broadening their personal abilities and the individual discretion of using these abilities in fulfilling tasks.

(7) **Work autonomy**; refers to the discretion someone experiences in fulfilling his/her tasks.

(8) **Work pressure**; refers to the time pressure that employees experience in their work.

(9) **Team learning**; refers to possible innovation and to the support employees experience for suggesting new working methods.

(10) **Cooperation among colleagues**; refers to the existence of teamwork.

(11) **Clarity of work rules**; refers to the degree to which employees know 'who does what'.

(12) **Clarity of role expectations**; refers to the degree to which employees know what they are expected to do.

5.3.3.4 Medical quality

Graff, Stevens, Spaite, and Foody (2002) define medical quality as *"the care health professionals would want to receive if they got sick"*. Broth's (1989) definition is much broader. He states that *"Quality is the degree of excellence at an acceptable price and the control of variability at an acceptable cost"*. This definition actually covers aspects that we included in dimensions of organizational performance described above, again showing that the dimensions are intertwined and not necessarily clear cut. Donabedian (1966) divides measures of quality of care into

structure, process, and outcome measures. Structure measures relate to the organization of care. Processes measures measure indicators of the patients' stay at a medical ward. Outcome measures relate to what happens after a patient left a ward. Flood and Scott (1982) depict the relationship between these three types of measures as,

structure → process → outcome,

because the structural setting can influence the care process which again can influence the medical outcomes. Donabedian (1966) thus provides a broad quality framework which is especially helpful for research focusing on patient streams. However, indicators of what he refers to as structure and process measures are in this study included in dimensions described earlier.

In this study, medical quality refers to the quality delivered by doctors at the ECU with regard to diagnosing patients. According to experts in the field, the main task of doctors working at ECUs is to stabilize unstable patients and to sufficiently diagnose them. When the patient is stabilized and the diagnosis is sufficiently clear, doctors at the ECU should either treat the patient if they can handle the complaint themselves, or they should arrange the patients' transfer to a specialty ward.

Medical quality is an important performance dimension in this study. Hospital practitioners in particular suggested including this rather medical dimension in the present study. In 2004, the Netherlands Health Care Inspectorate (*Inspectie voor de gezondheidszorg, IGZ*) stated that the traditional ECU staffing -consisting mainly of interns, GP-residents and residents- was not able to continuously guarantee a sufficient quality of medical care. Especially at night, when specialists are only available through their on-call duties, young inexperienced doctors are often overextended by the complex patients they face. The Inspectorate therefore claims that ECUs *"should be able to fulfill the norm of having at least one doctor with appropriate expertise and at least two year's hospital experience available around the clock".* If they do not comply with this claim, ECUs might be forced to close down. EPs are, due to their training and their extended experience, expected to provide higher medical quality than interns and GP-residents and at least the same medical quality as specialist residents. EPs are able to contribute to continuity to the care process as they are permanently based at the ECU, which residents cannot provide due to their own training engagement. Based on group discussions with health care experts, medical quality at the ECU was defined as a doctor's ability to correctly

diagnose a patient and arrange appropriate initial treatment, including the appropriate use of diagnostic tests and consultations. In line with this definition, the following indicators were defined to characterize medical quality:

(1) Correctness of the first diagnosis

(2) Appropriateness of the suggested treatment strategy

(3) Appropriateness of the ordered diagnostic tests

(4) Appropriateness of the ordered consults

(5) ECU doctor's need of supervision by medical specialist.

5.3.3.5 Summary of organizational performance variables

The previous sections described the different dimensions of organizational performance investigated in this study. As was said earlier in this chapter, these dimensions refer to different stakeholders, although they may be intertwined and not necessarily appeal to a single interest group only. To summarize the indicators, we want to pick up on Flood and Scott's (1987) categorization to measure quality of care. They assess the quality of care for two broad groups of stakeholders, patients and hospitals. We think that the distinction between patients and hospitals does not sufficiently capture all the stakeholders in organizational performance. Therefore we add a third stakeholder group to the concept, i.e. the staff. Table 5.1 summarizes all measures used in this study per primary interest group.

Table 5.1: Conceptualization of applied organizational performance indicators

PATIENTS	HOSPITALS	ECU STAFF
Organizational quality: • Waiting time • Treatment time • Throughput time • Number of unscheduled returns • Number of care providers **Medical quality:** • Correctness of the first diagnosis • Appropriateness of the suggested treatment strategy	**Costs:** • Number of diagnostic tests • Number of ordered specialist consults **Medical quality:** • Appropriateness of the ordered diagnostic tests • Appropriateness of the ordered consults • ECU doctor's need of supervision by specialist	**Working climate:** • Interpersonal atmosphere • Interpersonal support • Interpersonal harmony • Commitment • Opportunities for personal development • Challenging nature of the work • Autonomy • Time pressure • Team learning • Cooperation among colleagues • Clarity of work rules • Clarity of role expectations

5.4 Conceptual assumptions

This study draws on structural contingency theory to explore the impact of EPs on organizational performance. Structural contingency theory claims that the better the work structure fits the task environment, the better the organizational performance of a work unit. As described earlier, this study applies the systems approach to deal with the concept of "fit". It is based on "*the internal consistency of multiple contingencies and multiple structural characteristics"* (Drazin and Van de Ven 1985, p. 515). Van de Ven and Ferry (1980) argue that systematic differences in organizational structures should be expected to the extent that organizational units encounter varying tasks. They distinguish three different logics for patterns of organizational structure: the systematized, discretionary, and developmental mode.

The systematized mode is based on the logic of fitting an organizational structure to tasks that occur repetitively, are well understood and feature the same basic characteristics. Clear specifications exist about the steps to follow, their sequence and the ultimate target in terms of quality and quantity. Departures from the specifications are detected by built-in control mechanisms and human discretion is kept to a minimum. Coordination mostly takes place impersonally by means of central information systems or protocols. Task differentiation and standardization are high, e.g. very specific tasks are invariably attributed to the same person who fulfils them in exactly the same way whenever they occur. The required job expertise and discretion are low (e.g. the person fulfilling the task has no choice to fulfill the task in a different way) and due to the strict protocol he or she requires hardly any expertise. The interchangeability of roles is low to medium, indicating that other occupational roles – i.e. other occupations- cannot easily take over other colleagues' tasks. Van de Ven and Ferry (1980) refer to intensive-care nursing units as an example of the systematized mode in a health care setting. Several authors on emergency care organization, however, describe the ECU task environment as being characterized by high levels of uncertainty and variability, as it is neither known in advance how many patients will refer to the ECU nor what their complaints will be (Tregunno et al. 2004; Alexander and Randolph 1985; Argote 1982). The systematized mode is hence applicable for specialized medical departments with patients in a certain medical condition. It may be able to apply this mode for certain routine patients at ECUs, given the existence of work protocols. EPs are expected to follow protocols to a larger

extent than specialist residents. Besides, all doctors are expected to strictly follow protocols to stabilize unstable patients. Subsequently, however, they will always need to take decisions about diagnostic tests and further treatment, even if they follow given medical protocols. The systematized mode will therefore only appear *within* some other mode. It will hardly ever on its own be able to describe the typical medical care provided by doctors in ECUs.

The developmental mode of units is characterized by a high degree of task difficulty and variability (Van de Ven and Ferry 1980). Its logic is to create a program for handling tasks that have not been dealt with before or that are sufficiently complex to require group work. Hierarchies are very flat and coordination takes place by mutual group adjustments. Further characteristics of the developmental mode are a high job differentiation, low standardization and a high degree of discretion. Employees are thus confronted with many different and unpredictable tasks and they are free to find ways to fulfill the tasks. The work procedures are therefore not standardized. The pure developmental mode is not typical for medical care in ECUs. The often required timeliness of actions to be taken requires a high degree of standardization and cannot afford a lot of developmental mode.

The discretionary mode takes exceptions from standard situations into account. It is based on the logic that units need to create a program for organizing certain regularly recurring tasks. At the same time, exceptions or variations from these tasks can occur which demand flexible adjustments to handle them. Elements of the discretionary mode are, according to Van de Ven and Ferry (1980): (1) a fixed repertoire of given strategies to handle certain tasks, (2) guidelines for using discretion and responding to situations by providing criteria for selecting an appropriate strategy, (3) qualitative and quantitative standards for expected output. A hierarchical structure exists which broadly puts people into place, but coordination by mutual adjustment can be necessary, possibly temporarily shifting hierarchical boundaries. Discretionary mode units are characterized by low unit differentiation – i.e. various tasks can be fulfilled. Standardization of work procedures can vary according to specific situations and tasks. The job differentiation is low –i.e. employees are ideally able to fulfill a broad range of tasks instead of only a limited number. The required expertise is high. Job discretion can range from medium to high, depending on the nature of tasks to fulfill. Van de Ven and Ferry (1980) refer to medical units as examples of discretionary mode units.

Based on these different modes we will now draw a logical pattern for ECUs and derive propositions about its functioning. As Drazin and Van de Ven (1985: p. 522) say: *"The tasks for theorists and researchers adopting the systems definition of fit are to identify the feasible set of organizational structures and processes that are effective for different context configurations and to understand which patterns of organizational structure and process are internally consistent and inconsistent"*. Figure 5.3 illustrates the subsequent reasoning. The discretionary mode describes best the structure that is required by ECUs to fulfill their tasks. Although it is not possible to predict the number of patients or the nature of their complaints, most ECUs face stable yearly patient features. The volume and variability of ECU tasks will be more variable and unpredictable in large hospitals with many patients and somewhat less in small hospitals with fewer patients. As illustrated in Figure 5.3, different patterns can be distinguished for large teaching hospitals and for small non-teaching hospitals, as well as for ECUs that use EPs and those that do not use them. The occupational structure in large teaching hospitals is characterized by many different doctors at the ECU. If EPs are used, less different doctors should regularly fulfill tasks, as EPs are conceptualized to substitute other doctors, such as interns, GP-residents or other specialist residents. Whether or not EPs are used, the volume of education is high, as training doctors is one of the primary tasks in teaching hospitals. However, while the training is supervised by specialists in hospitals without EPs, the first supervisory contact partner for young residents could be a trained EP if available. Small non-teaching hospitals naturally have fewer different doctors available to fulfill ECU tasks as they do not always have residents in training. Even fewer different doctors will be used once EPs are staffing the ECU – they will be the only doctors besides consulting specialists (and eventually single residents from affiliated teaching hospitals). The managerial and political setting includes the managerial hierarchy and the diversity of opinions, which can be especially important when organizational change, such as the introduction of EPs, is discussed. Large teaching hospitals are likely to show a greater diversity of opinions than small hospitals, due to the larger number of different stakeholders. The micro-political heterogeneity is thus likely to be higher than in small hospitals. With regard to the management structure, both types of units, ECUs in large teaching as well as in small non-teaching hospitals, should exhibit a medical hierarchy, which is likely to be less rigid in small non-teaching hospitals. While vertical differentiation is likely to be more extensive in large size units (Mintzberg

TASK ENVIRONMENT AND CONTEXT

	LARGE TEACHING HOSPITAL		SMALL NON-TEACHING HOSPITAL	
	WITHOUT EPs	**WITH EPs**	**WITHOUT EPs**	**WITH EPs**
DEMANDED CARE				
Input volume	High		Lower	
Input variation	High		Lower	
Input predictability	Low		High	
PROFFESSIONAL RESOURCES				
Occupational structure (different doctors)	Many different doctors	Less different doctors	Few different doctors	Very few different doctors
Volume of education	High	High	Low	Low
MANAGERIAL AND POLITICAL SETTING				
Management structure	Clear medical hierarchy	Clear medical hierarchy	Less hierarchy, but medical manager	Less hierarchy, but medical manager
Political diversity of opinions	Diverse opinions due to many stakeholders		Less diverse opinions due to less stakeholders	

ORGANIZATIONAL STRUCTURE

DIFFERENTIATION				
Differentiation	High	Lower	Low	Lower
COORDINATION				
Programming	Much	Less	Little	Less
Feedback (group)	Much	Less	Little	Less
Feedback (personal)	High importance of specialists	Low importance of specialists; high importance of EPs	High importance of specialists	Low importance of specialists; high importance of EPs

ORGANIZATIONAL PERFORMANCE

	HIGH PERFORMANCE	LOW PERFORMANCE
ORGANIZATIONAL QUALITY OF CARE		
Waiting time	Short	Long
Treatment time	Short	Long
Throughput time	Short	Long
# of different care providers	Few	Many
# of unscheduled returns	Low	High
COSTS		
# of consultations	Low	High
# of diagnostic tests	Low	Many
WORKING CLIMATE		
MEDICAL QUALITY		
Correctness of diagnosis	High	Low
Appropriateness of treatment/tests/consultations	High	Low
Necessity of supervision	Low	High

Figure 5.3: Contingency framework for ECUs in large teaching and small non-teaching hospitals with and without EPs.

1983), smaller units are better able to mutually adjust both within and outside of hierarchies. They nevertheless need arrangements relating to medical responsibilities and these are ideally arranged by a medical ECU manager.

The described patterns of task environment need to "fit" the organizational structure for achieving a satisfactory organizational performance. Figure 5.3 depicts this interplay with a two-sided arrow; the plus sign indicates that both upper blocks together determine the lower one-sided arrow. In large teaching hospitals with many different tasks to fulfill, differentiation is higher than in small non-teaching hospitals. In small non-teaching hospitals, for example, nurses will have to arrange patients' admissions and doctors will have to write letters to GPs themselves, because the department may not have secretaries. Differentiation, however, decreases through EPs as they are designed to combine tasks that are otherwise executed by a variety of different doctors. This will show in both large teaching as well as in small non-teaching hospitals. As a consequence, hospitals that use EPs need less coordination than those without EPs. Differentiation, even with EPs, is higher in large teaching than in small non-teaching hospitals because a still higher number of different actors are included in the process of patient care. They therefore need more or more elaborate coordination mechanisms than small non-teaching hospitals to reintegrate the differentiated tasks. The relational structure also needs to correspond to the task environment: the care networks of ECU staff are likely to be larger and more complex in large teaching than in small non-teaching hospitals, because of the larger number of possible actors (for details and definitions of the calculated figures see section 6.2, pp. 99). ECUs that use EPs should feature a higher centrality than comparable hospitals (large teaching or small non-teaching) without EPs, because EPs are conceived as playing a dominant role in the care for ECU patients and act as 'lynchpins'. Features that measure diffusion in networks should consequently show lower scores.

In combination the characteristics described here lead to certain patterns in ECUs. These patterns are what we describe as *fit*: if the pattern is met, we assume a fit between the task environment and the organizational structure, which leads, according to the assumptions of structural contingency theory, to better organizational performance. If ECUs diverge from the pattern we assume a misfit. The unit's organizational performance will in that case be worse than if fit had been achieved. We want to link this reasoning to the research questions in this study (chapter 1.1). The questions relevant to this section of the book are the following:

(Q2) Under which task environmental and organizational circumstances can EPs contribute to improved organizational performance?

(*Q2-a) Can EPs contribute to a higher organizational quality of care?*

(Q2-b) Can EPs contribute to reducing costs?

(Q2-c) Can EPs contribute to a better working climate?

(Q2-d) Can EPs contribute to better medical quality?

We formulate theoretical propositions about these questions and answer them, based on the assumptions described above. These propositions will then be tested empirically.

Can EPs contribute to a higher organizational quality of care? EPs working in ECUs are designated to perform a filter function, in such a way that patients are sent (1) to a specialist only if the ECU staff cannot treat the patient themselves; EPs build up ECU specific expertise and experience which, together with their broad training, enables them to treat a number of patients without consulting a specialist. (2) If specialist treatment is required, patients will be sent to the *proper* specialist, based on an integral investigation. Through EPs fulfilling this filter function, division of work and task allocation between medical doctors is expected to shift as EPs take over tasks from other doctors. Even if EPs need other medical doctors' consultation or advice, many issues can be solved by telephone conversation without the specialist stopping by. This procedure saves time and the EP remains the patient's main point of contact. This change in task differentiation and coordination between and among physicians leads to the assumption that patient treatment times are shorter if EPs substitute inexperienced interns or GP residents. Shorter treatment times for patients make them leave the ECU sooner, leading to the availability of space (i.e. treatment rooms) and resources (i.e. nurses and doctors) for other patients who would otherwise need to spend the time in the waiting room. Waiting times are thus expected to decrease, which, together with the shorter treatment times, leads to decreased overall patients' throughput times. The new division of labor which accumulates tasks previously fulfilled by several doctors in the function of EPs, also leads to fewer contact persons for patients. EPs are expected to be responsible for the patient and to be the main contact person, thereby adding continuity of care as experienced by the patient. Patients will not receive inconsistent information about their condition from different people. They will be less uncertain about their condition and will therefore

be less likely to return unscheduled to the ECU. Based on this reasoning, we formulate the following propositions with regard to research question Q1-a: *(P1) Decreasing task differentiation and new coordination mechanisms –less formal coordination and more standardized coordination- enable*

(a) faster treatment times of patients
(b) shorter waiting times for patients
(c) faster overall throughput of patients
(d) higher continuity of care (i.e. patients face less different physicians)
(e) fewer unscheduled returns.

We expect similar effects through changes of the relational structure of patient care *(P2) Changes in the relational structure, i.e. more central doctors, lead to shorter throughput times and contribute to higher organizational quality of care.*

Can EPs contribute to reducing costs? EPs are doctors who are specifically trained to stabilize and treat patients who refer to the emergency department. These are to a large extent not emergency patients, i.e. they often have minor medical complaints from which they most likely not die. One main task for doctors who work at ECUs is therefore to assess the effort that each patient requires so that subsequently needed resources can be allocated accordingly. Not every sprain needs to be taken care of by a surgeon, whose scarce time should rather be spent on patients in more serious conditions who cannot be helped by anyone else. It is an even bigger waste of specialist work time if they are called to see patients who do not even require their expertise. E.g. a woman in her 30s referring to the ECU with abdominal pain (stomach ache) could first be seen by a surgeon, second by an internal medicine doctor, who might then, third, identify the gynecologist as the appropriate specialist. Not only would all the different doctors have needed to leave their own departments to come to the ECU, they would probably also have conducted various diagnostic tests to find out that they were not the appropriate doctor. During their training, EPs spend time with a variety of specialties in order to develop a holistic view of potential patient complaints. A surgeon looks at patients purely from a surgical perspective. EPs are trained to combine different specialties' perspectives and to investigate patients in a more undifferentiated way. Therefore, the differentiation of medical tasks, previously conducted by several doctors, is expected to shift by employing EPs. We therefore put forward the following proposition *(P3): Decreasing division of work*

between physicians leads to reduced consultations and less diagnostic tests, contributing to reducing costs.

Can EPs contribute to a better working climate? EPs, along with emergency nurses and receptionists (if existing), constitute the permanent staff of the ECU. Because of this permanent coexistence, staff members get to know each other better. Agreements can be kept more easily and nurses do not need to explain procedures anew every few months, which they need to do whenever new interns or residents start their ECU program. For EPs, the ECU is not just a temporary job in their training program but the place they chose as their preferred permanent work environment. They are prepared to take responsibility for the ECU and its patients, and to cooperate with the nurses in order to provide patient care. This new attitude of doctors in the ECU is expected to have an affect on the task differentiation and coordination between the different professional groups in a way that the experienced working climate of permanent staff members improves. Nurses and other employees are expected to experience a more pleasant working climate when working with EPs. EPs are expected to experience the working climate as more pleasant than (alternating) interns and (GP-)residents. We thus derive the following proposition with regard to research question Q1-c: *(P4) The continuous presence of EPs leads to a higher experienced working climate within the ECU.*

Can EPs contribute to better medical quality? The Dutch Health Care Inspectorate (IGZ 2004) stated that the traditional ECU staffing -consisting mainly of interns, GP-residents and residents- is not able to continuously guarantee sufficient quality of medical care. Especially at nights, when specialists are only available through their on-call duties, young inexperienced doctors are often overextended by the complex patients they face. Due to their training program, EPs, even if they hadn't yet finished their training would still have more extensive experience with emergency patients than interns and GP-residents. Specialist residents in their final years may also be sufficiently experienced. However, many specialist training programs include ECU training at the beginning of the training, so residents scheduled for ECUs often lack experience. EPs are further able to improve the continuity of the care process as they are permanently based at the ECU, which residents cannot provide due to their own training engagements. We define medical quality as correct diagnosing,

consulting appropriate specialties, conducting appropriate diagnostic tests, and suggesting appropriate further treatment. Our next proposition is as follows: *(P5): The medical quality provided by EPs is higher than by interns and GP-residents and at least comparable to residents.*